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Operable Unit 3-14

Tank Farm Soil and Groundwater

Phase I Remedial Investigation/ Feasibility Study Work Plan



Operable Unit 3-14 Tank Farm Soil and Groundwater Phase I Remedial Investigation/ Feasibility Study Work Plan

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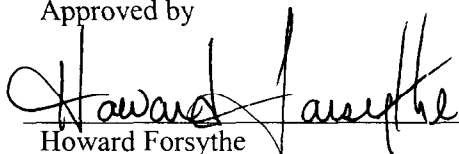
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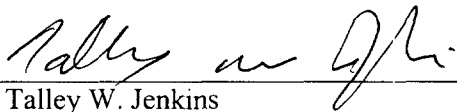
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ABSTRACT

This Work Plan for the Waste Area Group 3, Operable Unit (OU) 3-14, remedial investigation/feasibility study (RI/FS) is the planning document for the remedial investigation, baseline risk assessment, and feasibility study for contaminated soil in the Tank Farm, the former Idaho Nuclear Technology and Engineering Center (INTEC) injection well and Snake River Plain Aquifer (SRPA) within the INTEC fence line, and three additional soil sites from OU 3-13 that were assigned to OU 3-14 in the OU 3-13 Record of Decision for the INTEC. Operable Unit 3-14 was created by the U.S. Department of Energy, Idaho Operations Office; the U.S. Environmental Protection Agency, Region 10; and the Idaho Department of Health and Welfare, Division of Environmental Quality, because of several unresolved issues and uncertainties associated with the OU 3-13 Comprehensive RI/FS. These issues and uncertainties impeded selection of a final remedy for the sites cited above, as required under the Comprehensive Environmental Response, Compensation, and Liability Act.

The Work Plan describes historical site information, the data collection tasks, and proposed methodology for data use and interpretation associated with the production of a RI/FS report that supports selection of a remedial alternative to address contamination in subsurface soil and in the injection well and aquifer within the INTEC perimeter. Site data will be collected to support the selection of the final remedy for the Tank Farm soil, the INTEC injection well and the Snake River Plain Aquifer within the INTEC fence line, and the three additional sites from OU 3-13 using two characterization investigation phases.

Phase I will involve (1) collecting field-screening gamma-radiation data and initial soil-characterization data from Tank Farm soil, (2) coring the sealed INTEC injection well and installing aquifer wells around the well, (3) preparing technical papers for OU 3-14, and (4) reevaluating site information for the three soil sites from OU 3-13. The scope of the Phase II activities will depend on the results of the Phase I efforts but will involve, at a minimum, more detailed soil characterization of hot spots within Tank Farm soil, soil moisture monitoring at the Tank Farm, and additional groundwater monitoring data from the aquifer wells around the injection well. The risk assessment and groundwater modeling strategy will be determined after the results of Phase I activities have been evaluated. Treatability studies also may be conducted using both non-radioactive and radioactive soil from the Tank Farm. Feasibility studies will be prepared evaluating remedial alternatives on the basis of the new data.

The implementation of the OU 3-14 RI/FS will result in a timely selection of remediation options for the OU.

SUMMARY

This Work Plan for the Waste Area Group (WAG) 3, Operable Unit (OU) 3-14, remedial investigation/feasibility study (RI/FS) is the planning document for the remedial investigation, baseline risk assessment, and feasibility study for contaminated soil in the Tank Farm, the former the Idaho Nuclear Technology and Engineering Center (INTEC) injection well and Snake River Plain Aquifer within the INTEC fence line, and three additional soil sites from OU 3-13 that were assigned to OU 3-14 in the OU 3-13 Record of Decision (ROD) for the INTEC. The project was initiated in compliance with the 1991 Federal Facility Agreement and Consent Order (FFA/CO) implemented under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at the Idaho National Engineering and Environmental Laboratory (INEEL).

The current level of understanding of OU 3-14 sites is inadequate to make risk-based management decisions or to select appropriate remedies for Tank Farm soils and the former INTEC injection well and Snake River Plain Aquifer within the INTEC fence line. Therefore, an investigation of OU 3-14 sites is needed to reduce the level of uncertainty. This Work Plan summarizes what is known about the affected environment, the nature and extent of contamination, and risks posed by contamination. Data gaps are identified and tasks are described to gather additional information. The data will be used to assess the future fate and transport of contamination, to calculate risks to receptors, to compare to regulatory requirements, and to select appropriate remedies.

Over the next several years, the U.S. Department of Energy will close the eleven 300,000- and 318,000-gal and four 30,000-gal underground tanks within the Tank Farm because they do not comply with Resource Conservation and Recovery Act (RCRA) secondary containment requirements.

All known release sites within the INTEC were evaluated in the WAG 3 OU 3-13 Comprehensive RI/FS, which was finalized in December 1997. Because of greater than anticipated uncertainties associated with source estimation, contaminant mobility, and levels of contamination, a final remedy could not be selected for the sites. In January 1998, negotiations were begun between the U.S. Department of Energy, Idaho Operations Office (DOE-ID); the U.S. Environmental Protection Agency (EPA), Region 10; and the Idaho Department of Environmental Quality (IDEQ) to create the OU 3-14 RI/FS. The scope of the OU 3-14 RI/FS includes the contaminated soil at the INTEC Tank Farm, any residual contamination that may remain in the former INTEC injection well and the aquifer within the INTEC fence line, and contaminated soil within the three additional sites assigned to OU 3-14 from OU 3-13 in the OU 3-13 ROD.

Operable Unit 3-14 comprises one overarching site, CPP-96, the former INTEC injection well site, CPP-23, and the three sites carried over from OU 3-13:

- Site CPP-96. This site incorporates Tank Farm soil sites as defined in the OU 3-14 Scope of Work, CPP-15, CPP-20, CPP-25, CPP-26, CPP-27, CPP-28, CPP-31, CPP-32, CPP-33, CPP-58, CPP-79, and CPP-96, as well as three Tank Farm soil sites, CPP-16, CPP-24, and CPP-30, that were screened out for further action in the OU 3-13 RI/FS. In the OU 3-13 ROD, all Tank Farm soils and CERCLA sites were consolidated into CPP-96 to facilitate selection of remediation alternatives for the entire Tank Farm.

- Site CPP-23, the former INTEC injection well. The activities associated with this site also include all contamination in the Snake River Plain Aquifer within the INTEC fence line.
- Sites CPP-61, CPP-81, and CPP-82. These three sites were carried over to OU 3-14 from OU 3-13 because DOE-ID, EPA, and IDEQ determined that the data for these sites used in the OU 3-13 RI/FS were inadequate to make remediation decisions as required by CERCLA. The OU 3-13 ROD consolidated the three sites to OU 3-14 with all previously identified Tank Farm soil release sites and the interstitial soils within the CPP-96 boundary.

The Work Plan provides historical site information, and describes the data collection tasks, and the proposed methodology for data use and interpretation associated with the performance of a RI/FS and production of a RI/FS report that supports selection of a remedial alternative to address contamination in subsurface soil and in the injection well and aquifer within the INTEC fence line. Site data will be collected to support the final remedy for the Tank Farm soil, the INTEC injection well and Snake River Plain Aquifer within the INTEC fence line, and the three additional sites from OU 3-13 using two characterization investigation phases.

Phase I will involve (1) collecting field-screening gamma-radiation data and initial soil-characterization data from Tank Farm soil, (2) coring the sealed INTEC injection well and installing aquifer wells around the well, (3) preparing technical papers for OU 3-14, and (4) reevaluating site information for the three soils sites carried over from OU 3-13. The scope of the Phase II activities will depend on the results of the Phase I efforts but will involve, at a minimum, more detailed soil characterization of hot spots within Tank Farm soil, soil moisture monitoring in the Tank Farm, and additional groundwater monitoring data from the aquifer wells around the injection well. Risk assessment and groundwater strategies will be determined after the Phase I data have been reviewed. Treatability studies also will be conducted using both cold and hot soil from the Tank Farm. Feasibility studies will be prepared evaluating remedial alternatives on the basis of the new data.

The implementation of the OU 3-14 RI/FS will allow timely selection of remediation options.

The objectives of the OU 3-14 RI/FS are as follows:

Tank Farm Soil

- Evaluate process knowledge, facility documentation, and sampling of secondary sources in the environment to develop an estimate of the quantities of contaminants released to the environment through spills, leaks, and the disposal of waste liquids.
- Define the distribution, quantities, and concentrations of contaminants, especially plutonium isotopes, in Tank Farm soil to estimate soil volume and waste types requiring remediation.

- Collect site-specific soil chemistry and soil distribution coefficients (K_{ds}) for the contaminants of concern (COCs) defined in the OU 3-13 RI/FS and ROD, especially plutonium isotopes, for use in risk analysis and in understanding long-term risk reduction needs when evaluating remedial alternatives.
- Collect site-specific data to better bound and estimate the total contaminant mass source term in the soil for the contaminant transport simulations, in order to reduce the uncertainty of release estimates to the environment and the risks calculated for the Tank Farm.
- Define the soil waste types and volumes requiring remediation. Process knowledge indicates that high-level and low-level waste, high-activity waste, mixed waste (including suspected listed hazardous constituents), and transuranic (TRU) waste may be present in Tank Farm soil.
- Provide data for use in evaluating remedial alternatives for residual contamination waste types (if required) dealing with high-radiation fields during excavation, treatment, storage, and disposal.
- Provide a better understanding of moisture migration and the contaminant flux through Tank Farm soil.
- Develop a list of alternatives for remediating Tank Farm soil and evaluate alternatives using the nine CERCLA criteria established for remediation selection.

Injection Well and Aquifer Within the INTEC Fence Line

- Evaluate process knowledge, facility documentation, and sampling of secondary sources within the Snake River Plain Aquifer within the INTEC fence line to develop an estimate of the quantities of contaminants released to the environment through the injection of waste into the SRPA
- Define the distribution, quantities, and concentrations of contaminants in the INTEC injection well (CPP-23) and subsequent secondary sources from the injection of waste into the SRPA within the INTEC fence line to define their contribution of the risk to the groundwater pathway
- Develop a list of alternatives for remediating the injection well, if it poses an unacceptable risk, and evaluate alternatives using the nine CERCLA criteria established for remediation selection.

Additional Sites from OU 3-13

- Collect and review existing site-specific data for three sites assigned to OU 3-14 from OU 3-13 in the OU 3-13 ROD. Sites CPP-61, CPP-81, and CPP-82 will require further assessment because DOE-ID, EPA, and IDEQ determined that data for sites used in the OU 3-13 RI/FS were inadequate to make remediation decisions for the sites. The information derived from the data review will be summarized in a technical report for each site and reviewed by DOE-ID, EPA, and IDEQ.

To meet the objectives of the OU 3-14 RI/FS, several areas of uncertainty will be investigated, as described below.

From 1953 to 1992, INTEC reprocessed spent nuclear fuel, during which a variety of liquid waste was generated. High-level liquid waste was typically 1 to 3 molar nitric acid containing fission products, transuranic elements, and metals such as mercury and cadmium. The high-level liquid waste was sent to the underground Tank Farm for temporary storage. Other radioactive liquid waste was sent to the Tank Farm for storage or was sent to the Process Equipment Waste (PEW) Evaporator for concentration. The concentrated evaporator bottoms were sent to the Tank Farm for temporary storage. Liquid waste in the tanks was subsequently solidified for more secure extended storage. During transfers of waste liquids and maintenance operations, a number of spills and leaks occurred releasing liquid waste into the soil of the Tank Farm.

Risk from Tank Farm soil cannot be estimated with available data. The principal sources of uncertainty involved with estimating risk and selecting remedial alternatives for Tank Farm soil are:

- The total activity in the Tank Farm soil source
- The possible presence of other sources, not yet identified
- The volume and depth distribution of contaminated material
- The mobility of contaminants
- How contaminants react with geologic materials to retard their movement relative to the movement of water.
- The amount of water moving through Tank Farm soil
- The rate and timing of the release of contaminants from the source in surface soil to underlying basalt
- The activity and form of residuals left in the underground tanks after closure
- Material properties for assessment of treatment alternatives.

The condensate from the PEW Evaporator was combined with other plant process wastewater for disposal. From 1953 to 1982, these process wastewaters were disposed of to the Snake River Plain Aquifer through the injection well. In 1982, this water was rerouted to infiltration ponds. The injection well mainly discharged process wastewater directly into the aquifer. The injection well was abandoned and grouted in 1986, and sludge was left in the wellbore. The impact of the injection well on the water quality of the aquifer has been monitored for the past 40 years by the U. S. Geological Survey. The monitoring looked at mobile contaminants, sludge, and other residuals together, not at their individual contributions. With the closure of the injection well, the major contaminants in the injection well currently are contained in the sludge in the borehole. But the sludge and the area around the injection well have not been characterized to establish their contribution of risk to the aquifer within the INTEC fence line. Existing aquifer monitoring data are not sufficient to demonstrate that this sludge or other residuals from the injection of waste into the SRPA do not pose a long-term risk to human health.

The principal sources of uncertainty in estimation of risk and selection of a remedial alternative for the injection well comprise the following:

- Residual contamination within and near the wellbore and the mobility of any residual contamination
- The presence of contamination in the interbed lying between the H and I basalt flows, identified as the HI interbed (at a depth of 177 to 183 m [580 to 600 ft]) within the Snake River Plain Aquifer.

Inadequate data used in the OU 3-13 RI/FS for the three additional sites from OU 3-13, Sites CPP-61, CPP-81, and CPP-82, precluded making remediation decisions for these three sites.

A drilling and sampling program will be undertaken to obtain data on the nature and extent of contamination, to better refine the source, to look for additional sources and to obtain information on material properties of the Tank Farm soil. Wells will be drilled and completed around the area of the injection well in the Snake River Plain Aquifer within the INTEC fence line. Aquifer characterization and monitoring will permit assessment of the injection well as a continuing secondary source of contamination to the aquifer. Soil samples will be collected from Tank Farm soil to quantify the amount of contamination in the source and to look for additional sources. The primary target of additional sources is sources that pose a risk to the aquifer.

To predict the fate and transport of contaminants, the volume of water available to carry contaminants downward must be determined. The volume will be calculated by quantifying plant operations water releases, precipitation, evaporation, and moisture movement in the Tank Farm soil. Contaminants interact with geologic materials, and through this interaction are slowed relative to the movement of water. Laboratory studies on soil will be conducted to quantify such interaction for Tank Farm soil. The effects of the low pH of the initial releases will be addressed. Measurements of contaminants and other tracer species in soil can be used to calibrate the transport portions. From these investigations, an understanding of the geologic framework, the volume of water available to carry contaminants, and the interactions of contaminants with geologic materials will be developed. The understanding will be used to predict the fate of contaminants as they migrate through the Tank Farm soil.

A variety of potential technologies and techniques will be examined in the OU 3-14 feasibility study to determine whether they are plausible remedial solutions. A preliminary list of potential remedial technologies and techniques has been developed. Remedial technologies are grouped according to general response actions, which are broad descriptions of the remedial techniques that could be used to satisfy the remedial action objectives. Each general response action includes several specific technologies or techniques that will be evaluated to determine whether the action will satisfy the remedial action objectives. Treatability studies are planned to determine the viability of remedial alternatives. The studies would be used to demonstrate the technical feasibility of an alternative or to refine a technology for application to the unique circumstances of the Tank Farm and the injection well and aquifer within the INTEC fence line. In addition, the studies may be necessary to obtain accurate cost information for alternative comparison.

The organization of the Work Plan is described below:

- Section 1 contains introductory material

- Section 2 provides information related to the current status and operational history of the Tank Farm and the former INTEC injection well to aid in identifying data needs for the Work Plan
- Section 3 summarizes an initial evaluation of the work performed in the OU 3-13 RI/FS
- Section 4 summarizes the Work Plan rationale
- Section 5 presents identified RI/FS tasks including the characterization investigations that will be performed
- Section 6 contains the proposed schedule for OU 3-14 RI/FS activities
- Section 7 explains the project management plan
- Section 8 contains a compilation of the references used in the Work Plan

Information in the main body of the report is supplemented with several appendices and attachments. Appendices A through F support the Tank Farm history discussion in Section 2. Appendix G summarizes an investigation of potential release sites.

The following attachments to the Work Plan provide procedures for implementing RI/FS activities:

- *Phase I Tank Farm Soil Field Sampling Plan for the Operable Unit 3-14 Remedial Investigation/Feasibility Study* directs Tank Farm soil field sampling activities and contains detailed procedures for collecting and analyzing data
- *Phase I Idaho Nuclear Technology and Engineering Center Injection Well Field Sampling Plan for the Operable Unit 3-14 Remedial Investigation/Feasibility Study* directs INTEC injection well field sampling activities and contains detailed procedures for collecting and analyzing data
- *Phase 1 Waste Management Plan for the Operable Unit 3-14 Remedial Investigation/Feasibility Study* identifies the waste types and quantities expected to be generated during the implementation of the RI/FS.
- *Phase I Tank Farm Soil Health and Safety Plan for the Operable Unit 3-14 RI/FS* establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to persons performing tasks for the Tank Farm soil
- *Phase I Idaho Nuclear Technology and Engineering Center Injection Well Health and Safety Plan for the Operable Unit 3-14 Remedial Investigation/Feasibility Study* establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to persons performing tasks for the injection well drilling and sampling project

- *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites* includes procedures designed to ensure the integrity of samples collected, the precision and accuracy of the analytical results, and the representativeness and completeness of environmental measurements collected for CERCLA projects at the Idaho National Engineering and Environmental Laboratory (INEEL)

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ACRONYMS AND ABBREVIATIONS

AA	alternative actions
AOC	area of containment
ANL-W	Argonne National Laboratory West
ARAR	applicable or relevant and appropriate requirement
BLM	Bureau of Land Management
BRA	baseline risk assessment
bgs	below ground surface
CDL	conservation data center
CEC&C	closure evaluation criteria and checklist
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CLP	contractor laboratory program
COC	contaminant of concern
COPC	contaminant of potential concern
cpm	counts per minute
CPP	Chemical Processing Plant
CPT	cone penetrometer test
CSCR	cursory subcontractual compliance review
CSSF	Calcined Solids Storage Facility
D&D&D	deactivation, decontamination and dismantlement
DEQ	Idaho Department of Environmental Quality
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy, Idaho Operations Office
DQO	data quality objective
DR	decision rule

DS	decision statement
ECA	environmental controlled area
EDP	electrical dissolution process
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERIS	environmental restoration information system
ESRP	Eastern Snake River Plain
FAST	Fluorinel Dissolution and Process Storage Facility
FDP	fluorinel dissolution process
FFA/CO	Federal Facility Agreement and Consent Order
FS	feasibility study
FSP	field sampling plan
HASP	health and safety plan
HDR	hydrologic data repository
HLLW	high-level liquid waste
HLW	high-level waste
HLW&FD EIS	High-Level Waste & Facilities Disposition Environmental Impact Statement
HWMA	Hazardous Waste Management Act
ICDF	INEEL CERCLA Disposal Facility
ICPP	Idaho Chemical Processing Plant
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDW	investigation-derived waste
IEDMS	integrated environmental data management system
INEEL	Idaho National Engineering and Environmental Laboratory

INTEC	Idaho Nuclear Technology and Engineering Center
LDR	land disposal restrictions
LDUA	light duty utility arm
LET&D	liquid effluent treatment and disposal facility
LLW	low-level waste
MCL	maximum contaminant level
MCP	management control procedure
MDL	method detection limit
MIBK	methyl isobutyl ketone
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NRF	Naval Reactor Facility
NRTS	national reactor testing station
NSI	new site identification
NWCF	New Waste Calcining Facility
OU	Operable unit
PCB	polychlorinated biphenyls
PEW	process equipment waste
PRG	preliminary remediation goal
PSQ	principal study question
QAPjP	quality assurance project plan
RAF	Remote Analytical Facility
RAGS	Risk Assessment Guidance for Superfund

RAL	radiological analysis laboratory
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
RG	regulatory guide
RI	remedial investigation
RI/BRA	remedial investigation/baseline risk assessment
RI/FS	remedial investigation/feasibility study
ROD	record of decision
RPD	relative percent difference
RSD	relative standard deviation
RWMC	Radioactive Waste Management Complex
RWMIS	radioactive waste management system
SIR	submarine intermediate reactor
SMO	sample management office
SNF	spent nuclear fuel
SOW	scope of work
SRPA	Snake River Plain Aquifer
SSSTF	staging, storage, stabilization and treatment facility
SVOC	semivolatile organic compound
TAN	Test Area North
TBC	to be considered
TBP	tributyl phosphate
TCLP	toxicity characteristic leaching procedure
TLD	thermoluminescent dosimeter

TPR	technical procedure
TRA	Test Reactor Area
TRU	transuranic
TSCA	Toxic Substances Control Act
UREP	utilities replacement and expansion project
USGS	U.S. Geological Survey
VOC	volatile organic compound
VOG	vessel offgas
WAG	waste area group
WCF	Waste Calcining Facility
WIPP	Waste Isolation Pilot Plant
WIR	waste incidental to reprocessing

DEFINITIONS

The following definitions that apply to current or former Idaho Nuclear Technology and Engineering Center operations are provided to facilitate understanding of the material within this Work Plan:

- **Bottoms**—That portion of the material in an evaporation process that does not vaporize but remains in the body of the evaporator. Evaporator bottoms may be transferred as a batch or collected continuously in an overflow tank. The batch style is used in the Process Equipment Waste (PEW) Evaporator (in the Waste Treatment Building [CPP-604]) and in the High-Level Liquid Waste (HLLW) Evaporator (in the New Waste Calcining Facility) (NWCF) (CPP-659). The continuous style was used historically in the INTEC in the Fuel Processing facility (CPP-601) and is used in the Liquid Effluent Treatment and Disposal facility (LET&D) (CPP-1618) in the fractionating column (a series of multiple boiling and condensing steps).
- **Calcine**—Liquid radioactive waste that has been converted to a solid granular form. During the calcination process, the liquid in the radioactive waste is evaporated and the dissolved metals and fission products are converted to salts and oxides. Each granule is about 0.3 to 0.7 mm (0.01 – 0.03 in.) in size. Calcination typically reduces the volume of liquid waste by 2 to 10 times. Calcination at the INEEL is performed at the NWCF.
- **Heel**—The heel is the liquid and solid residue left in a tank after all possible waste has been removed using installed transfer jets. At the Tank Farm, the depth of the liquid heel typically varies from 7.6 – 254 mm (3 to 10 in.). The amount of that remains after the use of the installed equipment depends on the character of the heel itself and the location of the transfer jet suction. For example, a pump will be less effective at removal of the heel on one that is mostly solid than one that is mostly liquid. The solid heel results from precipitation of solids and other material to the bottom of a vessel. At the Tank Farm, the solid heel typically comprises 25.4 – 102 mm (1 to 4 in.) of solids at the bottom of the tank and is likely composed of solids precipitation, lesser amounts of undissolved process solids, and traces of dirt and debris. The balance of the heel is liquid up to the level of the jet suction.
- **High-activity waste**—Operationally based definition of a process radioactive waste stream that contains the relatively high fraction of radionuclides. Currently, this term is used when describing waste processes such as waste treatment that rely on separating waste into two fractions: “high” activity and “low” activity. Because the term has no regulatory basis, a high-activity waste stream could contain waste defined regulatorily as high-level waste, transuranic waste, sodium-bearing waste, or Process Equipment Waste (PEW) bottoms. Initially at the INTEC, high-activity waste was classified and stored as first-cycle raffinates (aluminum waste, zirconium waste, and fluoride waste), second- and third-cycle raffinates, and sodium-bearing waste. The classifications were based on the additives that a type of waste required for calcination.

- **High-level waste**—Source-based definition of high-level waste. Such waste results from the reprocessing of spent nuclear fuel. However, there is no precise widespread agreement currently about what constitutes high-level waste. For example, the U.S. Nuclear Regulatory Commission defines high-level waste as waste resulting from first-cycle extraction activities (10 CFR 61) while the U.S. Department of Energy (DOE) definition below from DOE Manual 435.1-1 clearly centers on the presence of radioactive constituents that would require permanent isolation through storage at a facility such as Yucca Mountain: “High-level waste is the highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and other highly radioactive material that is determined, consistent with existing law, to require permanent isolation.” Using the DOE definition, second- or third-cycle extraction waste and, therefore, sodium-bearing waste, could conceivably be considered high-level waste.
- **Incidental waste**—Radioactive waste incidental to uranium reprocessing operations; therefore, it does not meet the criteria for high-level waste. Examples of such waste ranges from wastewater used in the cleanup and flushing of process equipment and off-gas condensates to contaminated laboratory clothing, tools, and equipment. Such waste is classified as either transuranic or low-level waste.
- **Low-activity waste**—Operationally based definition of a process radioactive waste stream that includes the relatively low fraction of radionuclides. Currently, this term is sometimes used when describing waste processes such as waste treatment that rely on separating waste into two fractions: “high” activity and “low” activity. Because the term has no regulatory basis, the low-activity waste fraction could be low-level waste, transuranic waste, or even high-level waste.
- **Low-level waste**—Radioactive waste that is not high-level waste, spent nuclear fuel, transuranic waste, byproduct material, or naturally occurring radioactive material (DOE Manual 435.1-1). At the INTEC, this dilute, low-level waste is concentrated in the PEW Evaporator to conserve storage space and to facilitate future waste treatment. The High-Level Liquid Waste (HLLW) Evaporator is used to concentrate radioactive liquid waste that exceeds the radioactivity and chemical limits of the PEW Evaporator. After a waste stream is evaporated in the HLLW Evaporator, the overheads are sent to the PEW Evaporator and the Liquid Effluent Treatment and Disposal system to clean the stream before release to the environment via the Main Stack. Low-level liquid waste is generated at the INTEC by a variety of processes such as off-gas treatment, facility decontamination, equipment decontamination, and spent nuclear fuel storage.
- **Overheads**—That portion of the material in an evaporation process that vaporizes or is entrained in the vapor phase. The overheads can be condensed using a heat exchanger (i.e., a condenser) and collected in another tank or heated in a superheater for discharge as a vapor stream. In all INTEC processes, except the LET&D, overheads are condensed in condensers. In the LET&D, a superheater is used to achieve a dry gas and thereby prevent condensation of the vapors in the Main Stack (CPP-708).
- **Raffinate**—The waste from refinement processes. At the INTEC, raffinate referred historically to the waste products from the refinement of waste involved in first-, second-, and third-cycle reprocessing of spent nuclear fuel. Historically, the raffinates were separated into two categories: high-level waste from first-cycle extraction and sodium-bearing waste from second- and third-cycle extraction, which were blended with concentrated bottoms from the PEW Evaporator.

- **Sodium-bearing waste**—Waste generated from second- and third-cycle fuel extraction activities including the cleanup of solvent used to recover uranium and from decontamination. At the INTEC, such waste has historically been managed as high-level waste though it is actually mixed transuranic waste. An incidental waste determination would be required for sodium-bearing waste to be managed as transuranic waste. Sodium-bearing waste must be blended with non-radioactive materials such as aluminum nitrate before calcination.
- **Transuranic waste**—Radioactive waste (other than high-level waste or low-level waste) containing more than 100 nCi of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20-years. Transuranic waste does not require burial in a geologic repository but does require long-term storage in an approved transuranic storage facility such as the Waste Isolation Pilot Plant or the Nevada Test Site.
- **Waste incidental to reprocessing determination**—A determination issued by the U.S. Department of Energy, Idaho Operations Office, that a type of waste is incidental (as opposed to a direct result of reprocessing operations) to reprocessing operations. The determination can result in a categorization of the waste as either transuranic or low-level waste. The determination being sought for Tank Farm waste is to manage the waste as transuranic waste.

1. INTRODUCTION

This Work Plan provides a description of the data collection tasks and proposed methodology for data use and interpretation associated with the production of the Operable Unit (OU) 3-14, Tank Farm soil and groundwater remedial investigation/feasibility study (RI/FS). Operable Unit 3-14 is located in the north central portion of the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Engineering and Environmental Laboratory (INEEL) and comprises all surface soil within the Tank Farm boundary in accordance with the OU 3-14 Scope of Work (DOE-ID 1999c), the portion of the Snake River Plain Aquifer (SRPA) under the perimeter of the INTEC, and three additional soil sites within the INTEC. The Work Plan is prepared in accordance with EPA Guidance for Conducting Remedial Investigations and Feasibility Studies (EPA 1988) in compliance with the Comprehensive Environmental Response, Compensation, and Recovery Act (CERCLA) (42 USC § 9601 et seq.) and the Federal Facilities Agreement and Consent Order (FFA/CO) (DOE-ID 1991). A contour map of the INEEL showing the location of OU 3-14 is presented in Figure 1-1.

The goal of the Work Plan activities and planned data collection efforts is to provide sufficient data to complete the feasibility study and support selection of remedial alternatives to address contamination from release sites in OU 3-14: (1) Tank Farm soil sites, (2) the former INTEC injection well (Site CPP-23) and the aquifer underneath the area within the INTEC fence line, and (3) three additional soil sites, CPP-61, CPP-81, and CPP-82, carried over from OU 3-13. The three carried-over sites were assigned to OU 3-14 in the OU 3-13 Record of Decision (ROD) (DOE-ID 1999b) because the U.S. Department of Energy (DOE-ID), the Environmental Protection Agency (EPA), and the Idaho Department of Environmental Quality (IDEQ) determined that data for the sites used in the OU 3-13 RI/FS were inadequate to make remediation decisions as required by CERCLA.

1.1 INTEC and OU 3-14 Background

The INTEC is located in the south-central portion of the INEEL, as illustrated in the topographical map of the INTEC area (see Figure 1-2). Construction of the INTEC began in 1950, nuclear fuel storage operations began in 1952, and INTEC reprocessing of spent nuclear fuel was conducted from 1953 to 1992 (see Section 2). From 1953 until INTEC calcination activities began, the liquid waste from fuel dissolution and extraction reprocessing activities, often extremely high in radioactivity (i.e., containing thousands of curies of activity), accumulated in the Tank Farm, a series of underground stainless steel tanks enclosed in underground concrete vaults. From 1963 to 1981, the Waste Calcining Facility (CPP-663) operated on a plant scale, receiving Tank Farm liquid waste for calcination (the conversion of liquid radioactive waste to a granular solids form). After the first calcining facility was closed, the New Waste Calcining Facility began operations. Until June 2000, liquid waste from the Tank Farm was transferred to the New Waste Calcining Facility (NWCF) (CPP-659), the world's first production-scale calciner. The NWCF has the capability of reducing the liquid-waste volume by 2 to 10 times. The calcined granular solids are stored at the Calcined Solids Storage Facility (WINCO 1986; Palmer et al. 1998; DOE-ID 1997a).

Descriptions of OU 3-14 contamination sites are provided in Table 1-1. The locations of the contamination sites that compose OU 3-14 are shown in Figure 1-3.

Processes at the INTEC generated large volumes of service wastewater, particularly plant cooling waters and condensates, containing small proportions of radioactive and inorganic contaminants. From 1952 to 1984, the former INTEC injection well was used to discharge the low-level radioactive and chemical waste directly to the SRPA. The well was taken out of routine service in 1984 and used only for emergencies until 1986. No waste has been routed to the well since 1986, and the well was sealed and grouted with cement in 1989.

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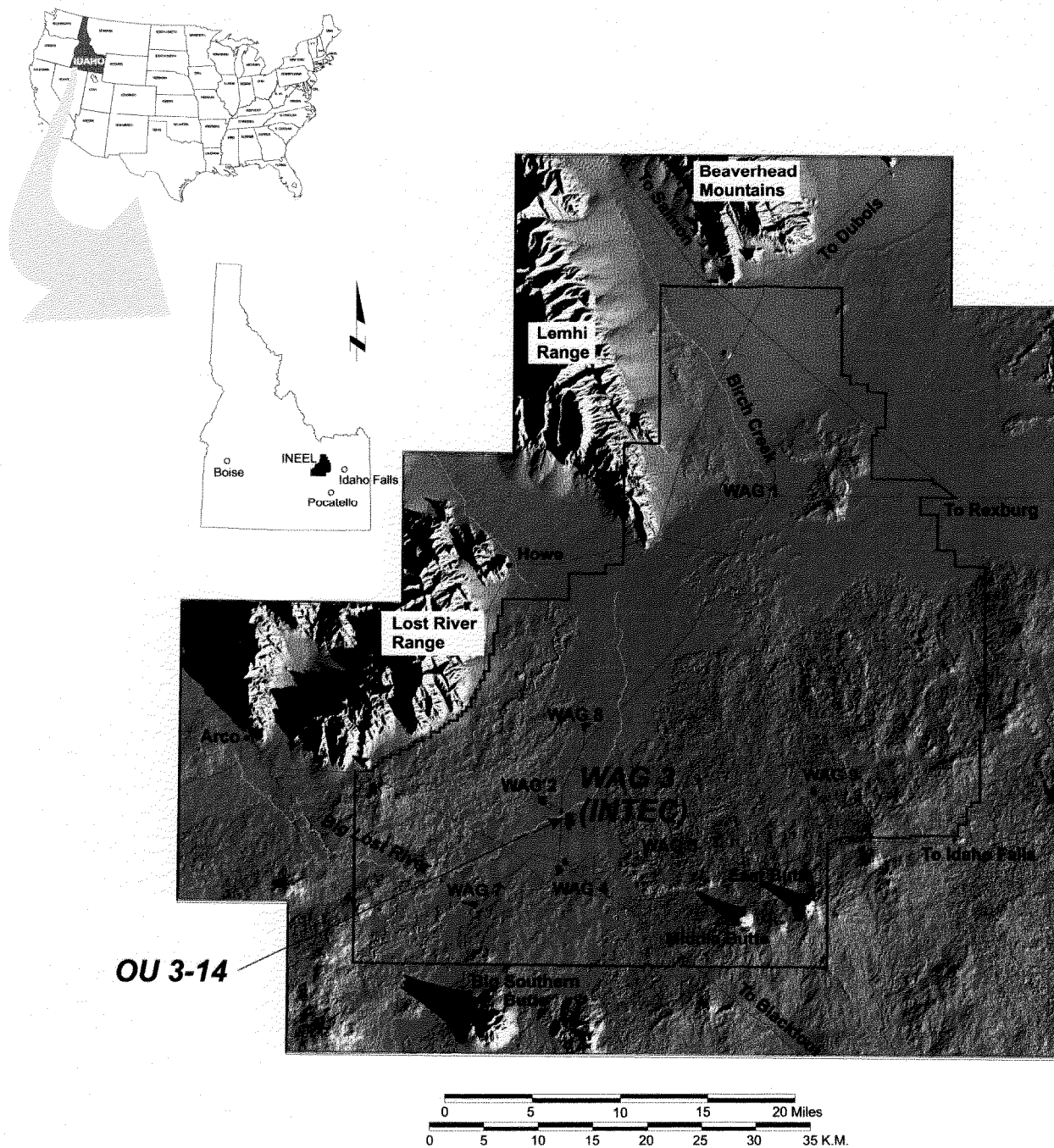


Figure 1-1. Map of the INEEL, showing the location of OU 3-14.

Table 1-1. Description of known release sites within OU 3-14.

Site	Description	Past Investigation
Site CPP-96, Tank Farm soil sites		
CPP-15	Site CPP-15 is the location of a waste solvent spill in the solvent burner east of CPP-605. The solvents contained primarily kerosene and tributyl phosphate degradation products with small quantities of radionuclides. The facility consisted of a firebrick-lined enclosure that used a standard furnace burner. The burner and building were removed in 1984. Radiological contamination was discovered at this site in 1995. Solvent-contaminated soil was removed during dismantling of the furnace and removal of the feed tank.	OU 3-08 Track 2 and the OU 3-13 RI/FS (WINCO 1993b; DOE-ID 1997a, 1997b)
CPP-16	Site CPP-16 is the site of a leak on January 16, 1976, through an open-bottom valve box during a routine transfer from WM-181 to Process Equipment Waste Tank, WL-102. The leak of low-level contaminated service wastewater drained out the bottom of the valve box into the soil to 0.9 m (3 ft) beneath the valve box, which was at a depth of 1.7 m (5 ft 8 in) (WINCO 1976, 1991). This valve box was replaced on January 19, 1976, with a concrete bottom valve box with a stainless steel liner that extends 2.0 m (6 feet 9 in.) below ground surface. The volume in WM-181 before the attempted transfer was 405,511 L (89,200 gal) and after was 389,600 L (85,700 gal) (Ward 2000); therefore, no more than 15,911 L (3,500 gal) leaked onto the soil. This site was screened as a no further action site in the OU 3-13 RI/FS. CPP-16 is being reevaluated in the OU 3-14 RI/FS as part of the Tank Farm soil investigation.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993d; DOE-ID 1997a)
CPP-20	Site CPP-20 is the location of the Radioactive Waste Unloading Area north of the PEW Evaporator (CPP-604). Waste from other INEEL facilities was transported to the INTEC where it was unloaded via transfer hoses to an underground storage tank before concentration in the Process Equipment Waste (PEW) Evaporator. The entire area was excavated and replaced with low-level radioactively contaminated backfill during upgrades in the Tank Farm.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993b; DOE-ID 1997a, 1997b)
CPP-24	Site CPP-24 is the result of a 4.5-L (1-gal) bucket spill of radioactively contaminated solution from Tank WM-180 in 1954. The spill occurred in the vicinity of a WM-180 tank riser and covered a 0.9 × 1.8 m (3 × 6-ft) area. Levels of radioactivity were surveyed at approximately 400 mR/hour. The spill would have contained mercuric nitrate, nitric acid, and radionuclides. In a Radioactivity Incident Report, the spill area was reported to be decontaminated. This site was screened as a no further action site in the OU 3-13 RI/FS. CPP-24 is being reevaluated in the OU 3-14 RI/FS as part of the Tank Farm soil investigation.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993b; DOE-ID 1997a, 1997b)
CPP-25	Site CPP-25 is the location of a release from a line rupture near Building CPP-604, which contaminated the building and adjacent soil. The area was excavated because of upgrades in the Tank Farm, and low-level radioactively-contaminated soil was used as backfill.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993b; DOE-ID 1997a, 1997b)
CPP-26	Site CPP-26 is the location of a radioactive steam release that occurred during decontamination of the transfer line before it was attached to the square vault inlets. This release is assumed to have contaminated 5.26 hectares (13 acres) to the northeast of CPP-635. The contaminated area has been designated as “inside” and “outside” the Tank Farm perimeter. As summarized in OU 3-13 RI/BRA, the Track 2 investigation recommendation for no further action was approved only for the “outside” area.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993d DOE-ID 1997a, 1997b)
CPP-27	Site CPP-27 consists of soil contaminated by a subsurface release of high-level liquid waste from the Tank Farm transfer system near the northeast corner of Building CPP-604. The soil contamination has been determined to be from a badly corroded section of a pressure relief vent line 3.7 m (12 ft) bgs.	OU 3-08 Track 2 and the OU 3-13 RI/FS (WINCO 1993b; DOE-ID 1997a, 1997b)

Table 1-1. (continued).

Site	Description	Past Investigation
CPP-28	Site CPP-28 is the location of about a 13,600-L (3,600-gal) high-level liquid waste leak to the surrounding soil from a 7.6-cm- (3-in.-) diameter stainless steel transfer line. This line was used to transfer radioactive first-cycle-extraction waste solution from the uranium recovery process to the underground storage tanks in the Tank Farm.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993d; DOE-ID 1997a, 1997b)
CPP-30	Site CPP-30 is an area of radioactively-contaminated soil near Tank Farm Valve Box B-9 discovered by maintenance personnel in 1975. The contamination covered an area of 30 m ² (400 ft ²) and produced radiation levels of up to 1 R/hour. The contamination resulted from a one-time maintenance event in which residual decontamination solution from the floor of the valve box contaminated worker clothing and equipment. This site was screened as a no further action site in the OU 3-13 RI/FS and is being reevaluated in the OU 3-14 RI/FS as part of the Tank Farm soil investigation.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993d; DOE-ID 1997a, 1997b)
CPP-31	Site CPP-31 is the location of a release of about 52,000 L (14,000 gal) of nonhigh-level liquid waste to the surrounding soil during a transfer between tank WM-181 and WM-180. The release was caused by the failure of a 7.6-cm- (3-in.-) diameter, carbon steel, waste transfer line.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993d; DOE-ID 1997a, 1997b)
CPP-32E	Site CPP-32E is a contaminated area suspected to have originated from a surface release of condensate originating from a vent tube in valve box B-4. The area of contamination was originally identified as 0.74 m ² (8 ft ²) and extended to a depth of 0.3 m (1 ft) below ground surface (bgs). Since the discovery of the contamination, the area has been covered with approximately 0.61 m (2 ft) of soil, the Tank Farm membrane, and another 15 cm (6 in.) of soil.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993d; DOE-ID 1997a, 1997b)
CPP-32W	Site CPP-32W is the location of a release of radioactive liquid from a 5.1-cm (2-in.) aboveground transfer line. The site was located approximately 15.2 m (50 ft) northwest of valve box, B-4. This release covered an area approximately 0.9 × 0.6 m (3 × 2 ft), having a radiation level as high as 2 R/hr.	OU 3-07 Track 2 and the OU 3-13 RI/FS (WINCO 1993d; DOE-ID 1997a, 1997b)
CPP-33	Site CPP-33 is the location of a radioactive liquid waste subsurface release from a leak of the Tank Farm transfer system.	OU 3-06 Track 2 and the OU 3-13 RI/FS (WINCO 1993c; DOE-ID 1997a, 1997b)
CPP-58E	Site CPP-58E is the location of a subsurface release of approximately 76,000 L (20,000 gal) of radioactively-contaminated PEW condensate. The release was caused by a failure of the condensate transfer line between the PEW Evaporator and Service Waste Diversion System. The line was excavated and repaired, but contaminated soil was left in place and covered with several feet of clean soil.	OU 3-11 Track 2 (WINCO 1993a)
CPP-58W	Site CPP-58W is the location of a subsurface release 1.8 to 2.4 m (6 to 8 ft) bgs of low-level radioactively-contaminated liquid from the underground transfer line from the PEW Evaporator to the monitoring station in CPP-709. This release occurred in 1954. Since the time of the release, Building CPP-649 was constructed on top of the area containing the spill. Minimum excavation for footings was 3.6 m (12 ft) bgs. The size and amount of the spills are unknown, but are believed to be contained under the building.	OU 3-11 Track 2 (WINCO 1993a)
CPP-79	Site CPP-79 is the location of a release of low-level radioactivity, heavy metals, and trace organic compounds from a transfer line between the Waste Calcining Facility and Tank WL-102. The release occurred in July and August 1986. The transfer line and valve box were at a depth of 3 m (10 ft) bgs.	OU 3-08 Track 2 and the OU 3-13 RI/FS (WINCO 1993b; DOE-ID 1997a, 1997b)
CPP-96	Interstitial soil areas within the Tank Farm and subsuming all other known release areas. This site includes the 1986 1,500-gal release in the general vicinity of Borehole A-61 southeast of Tank WM-180.	OU 3-13 RI/FS (DOE-ID 1997a, 1997b)

Table 1-1. (continued).

Site	Description	Past Investigation
INTEC Injection Well		
CPP-23	Site CPP-23 is the INTEC injection well, which was used for the disposal of cooling water and condensate, containing low levels of radioactivity, from 1952 to 1984. The well was used only for emergencies from 1984 to 1986. Sediments contained in the well were contaminated by the materials injected. No releases have occurred to the well since 1986. In late 1989, the injection well was sealed by perforating the casing throughout and pumping in cement. The well was sealed from the basalt silt layer (145 m [475 ft] bgs) to land surface to prevent hydraulic communication between the land surface, perched water, and the SRPA. More complete information about the INTEC injection well is provided in Section 2.3.	OU 3-02 Track 1, OU 3-07 Track 2, and the OU 3-13 RI/FS (WINCO 1992b, 1993d DOE-ID 1997a, 1997b)
Additional sites from OU 3-13		
CPP-61	Site CPP-61 is the location of a polychlorinated biphenyl (PCB) oil spill in the early 1980s within the CPP-718 transformer yard. Approximately 1,510 L (400 gal) of PCB oil was spilled. The PCB concentration in the oil was 179 ppm. Most of the spill was contained; however, some spilled oil contaminated the surrounding soil. In 1985, the spill area (approximately 58 m ² [625 ft ²]) was cleaned up. Approximately 40 drums of soil and debris were removed. A new transformer and concrete pad have been installed over the site. Three soil borings were drilled and soil samples analyzed for radionuclides. The radionuclides found were below risk-based soil concentrations (WINCO 1992a). The decision to transfer this no further action site to OU 3-14 in the OU 3-13 Record of Decision was based on the uncertain amount of PCB contamination that may remain under the concrete pad.	OU 3-01 Track 1 and the OU 3-13 RI/FS (WINCO 1992a, 1993b; DOE-ID 1997a, 1997b)
CPP-81	Site CPP-81 is an abandoned CPP-637/CPP-601 vessel off-gas (VOG) line from the 30-cm (12-in.) Calciner Pilot Plant. The line, 7.6 VOG-100, was located approximately 0.6 to 0.9 m (2 to 3 ft) bls and contained simulated calcine that became plugged in the line in 1986 following a test run, Run No. 15. During the fall of 1993, the line was cleaned as part of a time-critical removal action. In 1993, a portion of the line was removed, probably about 3 to 4 ft, and both ends have blind flanges on them (DOE-ID 1997; McCray 2000). The rest of the line, under a concrete floor at the south end of the Chemical Engineering Laboratory (CPP-620), was abandoned. The decision to transfer this no further action site from OU 3-13 to OU 3-14 was based on inadequate data used in the OU 3-13 RI/FS to make remediation decisions.	OU 3-12 Track 1 and the OU 3-13 RI/FS (WINCO 1994; DOE-ID 1997a, 1997b)
CPP-82	Abandoned Line 1.5 in. - PLA - 776 West of Beech Street. Site CPP-82 is the location of three wastewater spills (designated Sites A, B, and C) caused by rupturing of previously abandoned underground lines. The lines were ruptured during excavation activities. In the spill associated with Site A, an estimated 9.4 L (2.5 gal) of low-level radioactive waste escaped; the abandoned line and contaminated soil associated with the leak were removed and disposed of. Sites B and C are associated with spills of non-radioactive, nonhazardous wastewater; these spills occurred during the repair activities associated with Site A. The decision to transfer this no further action site from OU 3-13 to OU 3-14 was based on inadequate data used in the OU 3-13 RI/FS to make remediation decisions.	OU 3-12 Track 1 and the OU 3-13 RI/FS (WINCO 1992c; DOE-ID 1997a, 1997b)

With the diminishing need to recover and recycle the fuel, the U.S. Department of Energy (DOE) discontinued the INTEC mission of reprocessing spent nuclear fuel in 1992. The termination of reprocessing shifted the focus of the INTEC to management and storage of spent nuclear fuel, treatment and storage of liquid wastes, such as those generated during past reprocessing campaigns, and treatment and storage of low-level waste generated by other ongoing and future operations and activities at the INEEL.

Currently, the Tank Farm is used for interim waste storage of liquid waste (radioactive and hazardous). The Tank Farm system comprises the following equipment:

- Nine 300,000-gal (WM-182 through WM-190) and two 318,000-gal active stainless steel tanks contained in concrete vaults (WM-180 and WM-181) 13.7 m (45 ft) below grade (throughout this document, with the exception of a few historical descriptions, the 318,000-gal tanks are referred to as they are commonly known: 300,000-gal tanks, and these together with the nine 300,000-gal tanks are known as the eleven 300,000-gal tanks)
- Four inactive 30,000-gal stainless steel tanks (WM-103 through WM-106)
- Eight 18,000-gal process equipment waste (PEW) tanks, including the five main tanks, WL-101, WL-102, WM-100, WM-101, and WM-102; an 18,000-gal feed collection tank (WL-133); a 4,700-gal sedimentation tank (WL-132); and a new tank (WL-111) to replace WL-101 (to be abandoned until facility closure); plus the associated valve boxes, encasements, and piping (LMITCO 1999a, 1998). The PEW system is located in building CPP-604.

Over the next several years, the U.S. Department of Energy will close the eleven 300,000-gal and four 30,000-gal underground tanks within the Tank Farm because (1) reprocessing was terminated, and (2) the tanks do not comply with Resource Conservation and Recovery Act (RCRA) (42 USC § 9601 et seq.) secondary-containment requirements. Several factors, such as the impracticality of lifting the large tanks to install a liner underneath them, led to DOE's decision not to bring the tanks into RCRA compliance. Because PEW operations may continue after the Tank Farm is closed, the PEW tanks will be permitted as part of the PEW system. (The location of these tanks is shown in Figure 2-12.)

In 1990, a Notice of Noncompliance (EPA 1990) was issued for the Tank Farm underground tanks by the U.S. Environmental Protection Agency, based on an inspection performed the previous year by EPA and the Idaho Department of Health and Welfare. The Notice asserted that the eleven 300,000-gal tanks, storing corrosive and radioactive waste, and the associated piping, do not comply with secondary containment in accordance with RCRA in violation of 40 CFR § 265.193 (c) (1). To resolve the violations cited in the Notice of Noncompliance, a Consent Order (DOE-ID 1992) was agreed to in 1992 between the U.S. Department of Energy, Idaho Operations Office (DOE-ID), and the State of Idaho. Under the terms of the Consent Order, DOE-ID agreed to either stop using the tanks or bring them into compliance with the RCRA secondary containment requirements set forth in the Idaho Administrative Procedures Act (IDAPA) (16.01.05.009; 40 CFR 265.193).

The Second Modification to the Consent Order (DOE-ID 1998) stipulates that DOE must stop using five of the 300,000-gal tanks, WM-182, WM-183, WM-184, WM-185, and WM-186 by June 30, 2003, although the Order allows WM-185 to be used as an emergency spare. The Second Modification requires ceasing use of the remaining six 300,000-gal tanks, WM-180, WM-181, WM-187, WM-188, WM-189, and WM-190, by December 31, 2012. A tank is considered to meet the cease-use requirement if it has been emptied down to its heel. A heel is defined as the liquid volume remaining in the tank after it has been reduced to the greatest degree possible with existing tank transfer equipment

(Rasch 1994). The tanks will be closed in groups to facilitate plant operations until alternate facilities are available. The Second Modification also requires the submittal of a closure plan for one 300,000-gal tank to the State of Idaho by December 31, 2000. Tanks WM-182 and WM-183 will be the first tanks closed.

Radioactive and hazardous contaminants have been released over the past decades as spills and pipeline leaks of radioactive liquids to the environment from plant liquid transfer operations to the Tank Farm. According to the OU 3-13 ROD, contamination from releases within the Tank Farm boundary account for approximately 95% of the known contaminant inventory in total curies of radioactive material at the INTEC (DOE-ID 1999b, Section 4). Other past practices at the INTEC, then recognized as acceptable, included direct disposal of INTEC liquid waste through the former INTEC injection well to the SRPA. During the more than three decades of use of the injection well (from 1952 to 1986), about 11 billion gal of wastewater was discharged to the aquifer with an estimated radioactivity of 22,200 Ci. The major radionuclides of concern discharged in wastewater shipments to the well included H-3, Sr-90, and Cs-137 (DOE-ID 1997a). More complete information about the INTEC injection well is provided in Section 2.3.

Operable Unit 3-14 comprises one overarching site, CPP-96; the former INTEC injection well site, CPP-23; and the three sites carried over from OU 3-13:

- Site CPP-96. This site incorporates Tank Farm soil sites, as defined in the OU 3-14 Scope of Work: CPP-15, CPP-20, CPP-25, CPP-26, CPP-27, CPP-28, CPP-31, CPP-32E and CPP-32W, CPP-33, CPP-58E and CPP-58W, CPP-79, and CPP-96, as well as three Tank Farm soil sites: CPP-16, CPP-24, and CPP-30, which were screened out for further action in the OU 3-13 RI/FS. In the OU 3-14 ROD (DOE-ID 1999b), all Tank Farm soil and CERCLA sites were consolidated into CPP-96 to facilitate selection of remediation alternatives for the entire Tank Farm. The three no further action sites were assigned to OU 3-14 in the OU 3-13 ROD because with the consolidation of all Tank Farm soil and sites within CPP-96, these three sites are subject to the interim action specified for the Tank Farm in the OU 3-13 ROD and OU 3-14 RI/FS activities. The interim action relies on institutional controls with surface water control to reduce surface water infiltration into Tank Farm soil.
- Site CPP-23, the former INTEC injection well. The activities associated with this site also include all contamination in the Snake River Plain Aquifer within the INTEC fence line.
- Sites CPP-61, CPP-81, and CPP-82. These three sites from OU 3-13 also were no further action sites in the OU 3-13 RI/FS. They were assigned to OU 3-14 in the OU 3-13 ROD (DOE-ID 1999b) because DOE-ID, EPA, IDEQ determined that data for the sites, used in the OU 3-13 RI/FS, were inadequate to make remediation decisions, as required by CERCLA.

1.2 OU 3-14 Purpose

Operable Unit 3-14 will investigate (1) Tank Farm soil, (2) the INTEC injection well (Site CPP-23) and the Snake River Plain Aquifer within the INTEC fence line, and (3) three additional sites from OU 3-13 (CPP-61, CPP-81, and CPP-82).

The OU 3-14 Scope of Work (DOE-ID 1999c) defined the OU 3-14 RI/FS investigation as a focused study to provide additional information to select a final remedy for the Tank Farm soil and the INTEC injection well and the aquifer underneath the area within the INTEC fence line. The DOE-ID, the EPA, and the IDEQ determined in the OU 3-13 ROD that Tank Farm soil poses an external exposure risk, and leaching and transporting Tank Farm soil contaminants pose an additional future risk to the aquifer.

The INTEC injection well, Site CPP-23, was the primary means of disposing of service wastewater from 1952 to 1984 and was used only for emergencies from 1984 to 1986. It is believed to be the primary source of contamination in the underlying aquifer at the INTEC. More complete information about the INTEC injection well is provided in Sections 2.3 and 3.1.2. Information from the previous investigations about the nature and extent of the site contamination was incomplete. The aquifer underneath the area within the INTEC fence line will be evaluated in OU 3-14.

1.2.1 Tank Farm Soil

The following items are objectives of the OU 3-14 focused RI/FS for the Tank Farm:

- Evaluate thoroughly process knowledge, facility documentation, and sampling of secondary sources in the environment to develop an estimate of the quantities of contaminants released to the environment through spills, leaks, and the disposal of waste liquids.
- Define the distribution, quantities, and concentrations of contaminants, especially plutonium isotopes, in Tank Farm soil to estimate soil volume and waste types requiring remediation.
- Collect site-specific soil chemistry and soil distribution coefficients (K_{ds}) for analytes of concern, determined from OU 3-14 field investigation for use in risk analysis and understanding long-term risk reduction needs when evaluating remedial alternatives.
- Collect site-specific data to better bound and estimate the total contaminant mass source term in the soil for the contaminant transport simulations to reduce the uncertainty of release estimates to the environment and the risks calculated for the Tank Farm.
- Define the soil waste types and volumes requiring remediation. Process knowledge indicates that high-level and low-level waste, high-activity waste, mixed waste, including suspected listed hazardous constituents, and transuranic (TRU) waste may be present in Tank Farm soil.
- Provide data to evaluate remedial alternatives for residual contamination waste types, if required, dealing with high-radiation fields during excavation, treatment, storage, and disposal.
- Develop a list of alternatives for remediating Tank Farm soil and evaluate alternatives using the nine CERCLA criteria established for remediation selection.
- Provide a better understanding of moisture migration and the contaminant flux through Tank Farm soil.

1.2.2 Injection Well and Aquifer Underneath the Area Within the INTEC Fence Line

The following items are objectives of the OU 3-14 focused RI/FS:

- Evaluate thoroughly process knowledge, facility documentation, and previous sampling of the aquifer under the area underneath the area within the INTEC fence line to develop an estimate of the quantities of contaminants released to the environment through the injection of waste into the SRPA.
- Define the distribution, quantities, and concentration of contaminants in the INTEC injection well sediment (Site CPP-23) and subsequent secondary sources from the past injection of waste into the SRPA underneath the area within the INTEC fence line to define their contribution of the risk to the groundwater pathway.

- Develop a list of alternatives for remediating the injection well, if it poses an unacceptable risk, and evaluate alternatives using the nine CERCLA criteria established for remediation selection.

1.2.3 Additional Sites from OU 3-13

The following items are objectives of the OU 3-14 focused RI/FS:

- Collect and review existing site-specific data for three no further action sites assigned to OU 3-14 from OU 3-13 in the OU 3-13 ROD: Sites CPP-61, CPP-81, and CPP-82. The DOE-ID, EPA, and IDEQ determined that data for these sites used in the OU 3-13 RI/FS were inadequate to select remediation alternatives for the sites.
- Summarize the information, derived from the data review, in a technical report and obtain reviews from DOE-ID, EPA, and IDEQ.

1.3 OU 3-13 ROD Remediation Goals and Remedies

As mentioned previously, OU 3-14 was assigned to investigate the Tank Farm soil, the INTEC injection well and the SRPA underneath and within the INTEC fence line, and the three additional sites from OU 3-13 by the OU 3-13 ROD. Related to OU 3-14 RI/FS activities, the OU 3-13 ROD selected interim remedies for the Tank Farm soil and SRPA (outside of the Tank Farm fence), and a final remedy for the Perched Water. The OU 3-13 Tank Farm interim action is discussed in Section 1.6.4.

Perched water has been observed beneath the Tank Farm and poses a primary threat as a migration pathway of contaminants to the SRPA (DOE-ID 1999b). The OU 3-13 perched water remediation goals are to (1) reduce recharge to the perched zones, and (2) minimize the migration of contaminants to the SRPA so that SRPA groundwater outside of the current INTEC security fence meets applicable State of Idaho groundwater standards by 2095. The selected OU 3-13 Perched Water remedy is Institutional Controls with Aquifer Recharge Controls and includes the following items:

- Institutional controls that include limiting access, drilling, and using existing wells screened in the perched zones.
- Controlling surface water recharge to the perched water by taking the existing INTEC percolation ponds out of service and minimizing lawn irrigation at INTEC. Additional infiltration controls may include lining the adjacent reach of the Big Lost River, closing and relocating the existing sewage treatment plant lagoons and infiltration galleries, and upgrading INTEC drainage controls, repairing leaking fire water lines, and eliminating steam condensate discharges (DOE-ID 1999b).

The primary threat posed by a contaminated SRPA is ingestion of contaminated groundwater. The OU 3-13 remediation goals for the SRPA outside of the current INTEC security fence are (1) to prevent current onsite workers and non-workers from ingesting contaminated drinking water above the applicable State of Idaho groundwater standards or risk-based groundwater concentration during the institutional control period and (2) to achieve the applicable State of Idaho groundwater standards or risk-based groundwater concentrations in the SRPA plume south of the INTEC security fence by the year 2095. The selected OU 3-13 SRPA interim action is Institutional Controls with Monitoring and Contingent Remediation and consists of three components:

- Existing and additional institutional control maintenance over the surface area above the SRPA contaminant plume to prevent exposure to contaminated groundwater during the time the aquifer is expected to remain above MCLs
- Groundwater monitoring to determine if specific SRPA groundwater contaminant concentrations exceed their action levels and if the impacted portion of the aquifer is capable of producing more than 0.5 gpm, which is considered the minimum drinking water yield necessary for the aquifer to serve as a drinking water supply
- Contingent active pump and treat remediation if contaminant action levels are exceeded and production is greater than 0.5 gpm, such that the modeled aquifer water quality will exceed the MCLs after 2095 in the SRPA outside the current INTEC security fence (DOE-ID 1999b).

1.4 OU 3-14 Scope

The OU 3-14 RI/FS activities will include gathering site data to support the final remedy for the Tank Farm, the former INTEC injection well and aquifer underneath the area within the INTEC fence line, and the three additional soil sites from OU 3-13—Sites CPP-61, CPP-81, and CPP-82—using two characterization investigation phases.

- Phase I will involve (1) collecting field-screening gamma-radiation data and initial characterization data from Tank Farm soil, (2) opening the sealed INTEC injection well by coring and installing aquifer wells around the well, (3) preparing technical papers for OU 3-14, and (4) reevaluating site information for the three soil sites carried over from OU 3-13.
- Phase II activities will depend on the results of the Phase I efforts, but will involve at a minimum more detailed soil characterization of hot spots within Tank Farm soil, soil moisture monitoring in the Tank Farm, and additional groundwater monitoring data from the aquifer wells around the injection well. There are no Phase II activities for the injection well (Site CPP-23).

Treatability studies may be conducted using both cold and hot soil from the Tank Farm. Feasibility studies will be prepared evaluating remedial alternatives on the basis of the new data. Specifically, the following tasks were identified in the OU 3-14 Scope of Work (DOE-ID 1999c):

1.4.1 Tank Farm Soil

The Tank Farm soils have been excavated and backfilled numerous times, and the source or nature of the backfill material used has not fully characterized or documented. This implies that a degree of uncertainty exists with respect to the homogeneity of the Tank Farm soils. This uncertainty will be taken into account when designing a statistical analysis for defining the parameters of a representative soil sample and for defining what the soil characterization data spatially represents.

- The Tank Farm soil from 0 to 3 m (0 to 10 ft) will be characterized to define the type and extent of contamination, contributing to the external exposure risk, which requires remediation to support the final remedy selection.

- The Tank Farm soil from 0 to 13.7 m (0 to 45 ft) will be characterized to help define the type and extent of contamination, contributing to the groundwater ingestion risk, which requires remediation to support the final remedy selection.
- The soil moisture within Tank Farm soil will be characterized to determine the contaminant transport potential of the contaminant sources in Tank Farm soil, the moisture flux rate into basalt, and the impact of soil moisture on selected remedial alternatives.
- The geochemical environment of Tank Farm soil will be characterized to define contaminant mobility for contaminant transport simulations, to predict releases to the environment, and to assess the contribution of Tank Farm contaminants to the groundwater pathway risk.
- The nature and extent of contamination within Tank Farm soil will be characterized to developing and screening remedial alternatives.
- Bench- and pilot-scale tests may be conducted on technologies requiring detailed evaluation for treatment, storage, or disposal of Tank Farm soil and groundwater underneath the area within the INTEC fence line.
- Tank Farm soil will be characterized to define waste types that may be generated for treatment, storage, or disposal during future remediation activities.

1.4.2 Injection Well and Aquifer within the INTEC Fence Line

Site data will be gathered and reviewed to support the final remedy for the injection well and the aquifer inside the INTEC fence:

- Aquifer wells will be used to investigate the INTEC injection well (Site CPP-23) to evaluate the residual source of groundwater contamination contributing to the future groundwater ingestion risk.
- Groundwater samples for analytes of concern from the SRPA will be collected above, within, and below the HI interbed (158.5 to 167.6 m [520 to 550 ft]).
- Contributions of contaminants from Tank Farm soil will be evaluated to determine the future risk to the aquifer within the INTEC fence line.

1.4.3 Additional Sites from OU 3-13

Existing data will be reviewed and investigated for possible contaminant releases at Sites CPP-61, CPP-81, and CPP-82, assigned to OU 3-14 in the OU 3-13 ROD, to determine the remediation options for the sites. The information derived from the data review will be summarized in a technical report for each site and reviewed by DOE-ID, EPA, and IDEQ.

For the OU 3-14 FS, feasible treatment technologies will be identified and screened according to their effectiveness, cost, and implementability. It is anticipated that only limited site risk assessment and groundwater modeling will be required to support the remedy selection. In the OU 3-13 ROD (DOE-ID 1999b), Tank Farm soil was determined to represent a risk by direct radiation exposure and by the leaching and transport of contaminants to the SRPA. Also, the aquifer poses a risk from ingestion to future groundwater users. The specific need and method for completing the risk assessment and groundwater modeling for OU 3-14 will be determined, pending the collection of the Phase I data. The scope of the contaminant transport study, treatability studies, and feasibility study also will be determined following the collection and interpretation of the Phase I data.

1.5 INEEL Background

Originally established in 1949 as the National Reactor Testing Station (NRTS), the INEEL is a DOE-managed reservation devoted to energy research and related activities. The NRTS was redesignated as the Idaho National Engineering Laboratory (INEL) in 1974 to reflect the broad scope of engineering activities taking place at various facilities. More nuclear reactors and a wider variety of reactor types have been built at the INEEL than at any other single location in the world. Currently, only two INEEL reactors are operating. The remaining reactors have been phased out because their missions were completed (Irving 1993; Becker et al. 1998).

The INEL was redesignated the Idaho National Engineering and Environmental Laboratory in 1997 to demonstrate contemporary emphasis on environmental research. Current INEEL activities address challenges presented by spent nuclear fuel management, hazardous and mixed waste management and minimization, cultural resources preservation, and environmental engineering, protection, and remediation (DOE-ID 1996). Current research focuses on environmental restoration and waste management issues (Becker et al. 1998).

The INEEL is located in southeastern Idaho and occupies 2,305 km² (890 mi²) in the northeastern region of the Snake River Plain (see Figure 1-1). Regionally, the INEEL is nearest to the major population centers of Idaho Falls and Pocatello and to U.S. Interstate Highways I-15 and I-86. The INEEL Site is nearly 63 km (39 mi) long from north to south, about 58 km (36 mi) wide in its broadest southern portion, and occupies portions of five southeast Idaho counties: Butte, Bingham, Bonneville, Jefferson, and Clark. Most of the INEEL lies within Butte County. Approximately 95% of the INEEL has been withdrawn from the public domain. The remaining 5% includes public highways (U.S. 20 and 26 and Idaho 22, 28, and 33) and the Experimental Breeder Reactor I, which is a national historic landmark (Irving 1993; Becker et al. 1998).

The surface of the INEEL is a relatively flat, semiarid, sagebrush desert. Predominant relief is manifested either as volcanic buttes jutting up from the desert floor or as unevenly surfaced basalt flows or flow vents and fissures. Elevations on the INEEL range from 1,460 m (4,790 ft) in the south to 1,802 m (5,913 ft) in the northeast, with an average elevation of 1,524 m (5,000 ft) above sea level (Irving 1993).

Bordering the INEEL on the north and west are mountain ranges: the Lost River Range, the Lemhi Range, and the Beaverhead Mountains (see Figure 1-1). The lands that surround the INEEL are managed as rangeland, agricultural lands, U.S. Forest Service lands, and U.S. Bureau of Land Management (BLM) lands. In the western portion of the INEEL, intermittently flowing waters from the Big Lost River flow to the Lost River Sinks in the northwest portion of the INEEL. Water either evaporates or infiltrates into the Snake River Plain Aquifer at the sinks. Normally, water is diverted for irrigation before reaching the INEEL and only flows onto the INEEL Site when sufficient snowpack occurs to provide spring runoff (Becker et al. 1998).

Irrigated farmlands exist adjacent to approximately 25% of the INEEL boundary (Becker et al. 1996). Lands acquired for the NRTS were originally under control of the BLM and were withdrawn through public land orders in 1946, 1949, and 1950. Until these withdrawals, the land was used primarily as rangeland. From 121,410 to 141,645 ha (300,000 to 350,000 acres) within the perimeter of the INEEL has been opened to grazing through permits administered by the BLM. Since 1957, approximately 1,386 km² (535 mi²) in the central portion of the INEEL has been maintained as a grazing exclusion area. Historically, portions of this central core have been used as bombing and gunnery ranges. Currently, the largely undeveloped central portion of the INEEL is reserved for ecological studies of sagebrush-steppe ecosystems (Becker et al. 1998).

The INEEL has nine distinct and geographically separate functional facility areas corresponding to nine WAGs. Each area serves or has served a particular programmatic or support activity. As governed by the FFA/CO (DOE-ID 1991), the remedial evaluations for each facility area must address impacts to the aquifer, generated by operations within each of the WAGs, with the remaining portions of the aquifer across the INEEL addressed by WAG 10.

Waste Area Group 3 comprises the INTEC facility and was subdivided into 13 OUs that were investigated for contaminant releases to environmental pathways. During the OU 3-13 comprehensive RI/FS and subsequent remedy development, data gaps were identified. In some cases, the missing data were important enough to prevent selection of final remedies. In particular, data were insufficient to select final remedies for Tank Farm soil, the INTEC injection well and aquifer within the INTEC fence line, and additional soil sites from OU 3-13: CPP-61, CPP-81, and CPP-82. Operable Unit 3-14 was created to gather the additional necessary data to allow selection of final remedies for these areas.

1.6 Regulatory Background

On July 14, 1989, the INEEL was proposed to be added to the EPA National Priorities List (NPL) (54 FR 48184). This listing was proposed using Hazard Ranking System procedures found in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300). The INEEL received a score of 51.91. Data supporting listing the INEEL as an NPL site are found in the Federal Facilities Docket, EPA Headquarters, Washington, D.C. As a federal facility, the INEEL is eligible for the NPL pursuant to the requirements of the NCP (40 CFR 300.66(c)(2)). After considering public input during a 60-day comment period, the INEEL was placed on the NPL and became subject to the provisions of CERCLA (42 USC § 9601 et seq.) on November 15, 1989. Contaminated sites at the INTEC contributed to listing the INEEL on the NPL. As a result of listing on the NPL, the DOE, EPA Region 10, and IDEQ negotiated a Federal Facilities Agreement/Consent Order (FFA/CO) and Action Plan (DOE-ID 1991) to implement the remediation of the INEEL under CERCLA. For management purposes, the FFA/CO divided the INEEL into 10 WAGs. The INTEC was designated as Waste Area Group (WAG)3. WAG 3 is further divided into 14 operable units (DOE-ID 1999b).

The goals of the FFA/CO are to ensure (1) that potential or actual INEEL releases of contaminants to the environment are thoroughly investigated in accordance with the NCP and (2) that appropriate response actions are taken to protect human health and the environment. The FFA/CO established the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with CERCLA and RCRA (42 USC § 6901 et seq.) legislation and the Idaho Hazardous Waste Management Act (IC § 39-4401). The FFA/CO is consistent with a general approach approved by DOE and the EPA in which agreements with states as full partners would allow site investigation and cleanup to proceed, using a single road map to minimize conflicting requirements, and maximize limited remediation resources.

The Secretary of Energy's policy statement (DOE 1994) on the National Environmental Policy Act (NEPA) (42 USC § 4321 et seq.) stipulates that DOE will rely on the CERCLA process for review of actions to be taken under CERCLA. The policy statement also requires that DOE address NEPA values and public involvement procedures by incorporating NEPA values to the extent practicable in documents and public involvement activities generated under CERCLA.

All known release sites within the INTEC were evaluated in the OU 3-13 Comprehensive RI/FS (DOE-ID 1997a, 1997b). Ninety five release sites were evaluated in the remedial investigation (RI) (DOE-ID 1997a) but only 40 exceeded the soil remedial action objectives (RAOs) in the OU 3-13 FS and thus were further evaluated in the OU 3-13 FS detailed analysis (DOE-1997b). The OU 3-13 RI/FS was finalized in December 1997, but because of greater than anticipated uncertainties associated with source

estimation and contaminant mobility, selection of a final remedy for the Tank Farm was deferred until additional data are collected. As a result, in January 1998, a joint decision was made between DOE-ID, EPA, and IDEQ to further investigate this area under a separate operable unit designated as OU 3-14.

1.6.1 HWMA/RCRA Status of the Tank Farm

The Tank Farm is currently operating under Hazardous Waste Management Act (HWMA)/RCRA interim status (LMITCO 1999b). It is DOE's intent that as each tank is successfully closed as a HWMA/RCRA interim status unit, the closed tank system will be evaluated in accordance with OU 3-13 Record of Decision and the agency-approved Operable Unit 3-13 Group 2 Closure Evaluation Criteria and Checklist (CEC&C). Upon closure of units, the new site identification (NSI) process will be instituted, as identified in the CEC&C. This process establishes the process that CERCLA uses to evaluate closures to determine if RAOs and regulatory guides (RGs) are met and if the site needs to be included in the existing WAG 3 OU 3-13 grouping, if they should be added to OU 3-14, or if an additional OU should be designated. The closed tanks will also be evaluated under the CERCLA 5-year review cycle to determine subsequent risk.

1.6.2 Regulatory Integration

The DOE relies on the CERCLA process to address the environmental aspects of CERCLA projects. The CERCLA documents are functionally equivalent to NEPA documents, and NEPA aspects are addressed that could be significantly impacted by the project. The DOE has the responsibility for ensuring that NEPA requirements are incorporated into CERCLA documents.

To ensure that all environmental aspects will be reviewed during the planning phases of this project, an environmental checklist with attachments will be prepared in parallel with and incorporate activities described in this Work Plan. Any significant environmental issues discovered in the environmental checklist review will be addressed in the OU 3-14 RI/FS. The completed environmental checklist with attachments will be submitted as background to and concurrent with the appropriate CERCLA project document.

The Idaho High-Level Waste and Facilities Disposition Draft Environmental Impact Statement (HLW & FD EIS) (DOE 1999) was released in December 1999 for public comment. Some of the facilities addressed in the HLW & FD EIS are located within OU 3-14. The EIS compares alternatives for closing the Tank Farm and estimates the potential risk posed to the aquifer after implementing the various alternatives for facility closure. Modeling conducted in support of the EIS alternative evaluation did not incorporate the contaminated soil in the Tank Farm. It is anticipated that modeling conducted for OU 3-14 will be able to accommodate the Tank Farm soil and tank residuals as a source. The source term, used for the tanks, will be based on the anticipated end state and residual concentrations, as provided in the HLW & FD EIS ROD. Assumptions about content, leak rate, and tank corrosion rate will be obtained from other documents such as the HLW & FD EIS.

The hazardous components stored at the Tank Farm are regulated through the IDEQ. The IDEQ State Waste Management and Remediation Division has closure oversight of RCRA-regulated facilities incorporated by the HWMA.

The HWMA program will close the active tanks and ancillary systems, which will be identified in the HWMA Closure Plan. Releases to the environment and those components that are not assessed under the HWMA closure will be evaluated by CERCLA using the new site identification process. Furthermore, following HWMA closure, the HWMA-closed system will be evaluated by CERCLA, using the new site identification process identified in the CEC&C.

1.6.3 Tank Farm Waste Management and Closure Agreements

The *Settlement Agreement* or “Batt Agreement,” signed in 1995 by DOE, the Idaho Department of Health and Welfare, and the U.S. Department of the Navy (DOE 1995), and the *Second Modification to Consent of the Notice of Noncompliance* (DOE-ID 1998) establish enforceable regulatory milestones for the tanks and tank contents at the Tank Farm. The Settlement Agreement requires treatment of the existing liquid sodium-bearing waste and other liquid inventories in the Tank Farm by December 31, 2012, and treatment for long-term storage or disposal of all high-level waste at the INEEL by 2035. The Second Modification, along with the First Modification (DOE-ID 1994), which the Second superseded, revised the Consent Order, entered into in 1992 between the State of Idaho and DOE-ID (DOE-ID 1992). The Consent Order was a resolution of alleged violations contained in a Notice of Noncompliance issued in 1990 by the EPA. The Notice of Noncompliance for the Tank Farm was based on lack of compliance with RCRA requirements for secondary containment of the 300,000-gal tanks and their associated piping. The Consent Order provided schedules for either bringing the Tank Farm into compliance with secondary containment requirements or closing the tanks. The DOE has decided to close the eleven 300,000-gal and four 30,000-gal underground tanks within the Tank Farm because of the termination of reprocessing and several other factors, such as the impracticality of lifting the large tanks to install a liner underneath them, that impede bringing the tanks into compliance.

During the closure, portions of the Tank Farm will remain operational to provide support for INTEC operations until alternative facilities are available. In addition, final closure under HWMA/RCRA must meet DOE radioactive waste management requirements (DOE Order 435) and be integrated with CERCLA (42 USC 9601 et seq.) environmental risk management decisions for contaminated soil surrounding Tank Farm system components (LMITCO 1998). As each tank is closed under HWMA/RCRA, the closed tank and ancillary equipment will be evaluated under CERCLA, using the new site identification process identified in the CEC&C.

The current regulatory deadlines applicable to the closure of the Tank Farm are provided in Table 1-2.

1.6.4 OU 3-13 Tank Farm Interim Action

In October 1999, the Record of Decision was issued for OU 3-13. The OU 3-13 ROD specified an interim action for the Tank Farm soil sites because inadequate data were available to select a final remedy in OU 3-13. The DOE-ID, EPA, and IDEQ determined in the ROD that an interim action was necessary, specifically, because of the uncertainty associated with the contaminant source estimates, potential releases from the Tank Farm soil, contaminant extent, and site risk (DOE-ID 1999b, Sections 4 and 9). The interim action will be in place until the final remedy for these sites is selected and implemented as part of the OU 3-14 RI/FS process.

The interim action is designed to control the principal threats at the site, to control exposure to contaminants in Tank Farm soil, and to minimize moisture that may infiltrate through Tank Farm soil and leach and transport contaminants to the SRPA. According to the OU 3-13 ROD (DOE-ID 1999b), the following items are remediation goals for the Tank Farm Soils interim action:

- Prevent intrusion into soil contaminants by the general public
- Reduce precipitation infiltration by approximately 80% of the average annual precipitation at the site
- Maximize runoff and minimize surface water ponding on the Tank Farm
- Prevent surface water run-on from a one in 25 year, 24-hour storm event

Table 1-2. Current regulatory milestones for closure of the Tank Farm.

Regulation	Source	Comment
Complete calcination of high-level waste (HLW) by June 30, 1998.	<i>Settlement Agreement</i> ^a	Calcination of HLW waste was completed ahead of schedule in February 1998. ^b
Submit closure plan for one tank to the Idaho Department of Environmental Quality (DEQ) by December 31, 2000.	<i>Second Modification to Consent Order to the Notice of Noncompliance</i> ^c	A draft closure plan will be submitted to the State of Idaho for joint closure of two tanks, WM-182 and WM-183, by December 31, 2000.
Commence calcination of sodium-bearing waste by June 1, 2001.	<i>Settlement Agreement</i>	Calcination of sodium-bearing waste commenced ahead of schedule in February 1998. ^b
Cease use of Tanks WM-182 through WM-186; except WM-185, designated as a possible emergency spare, by June 30, 2003.	<i>Second Modification to Consent Order to the Notice of Noncompliance</i>	
Submit application to DEQ for RCRA Part B permit for calcined waste treatment by December 1, 2012.	<i>Settlement Agreement</i>	The final schedule for sodium-bearing and calcined waste treatment will be determined in the Record of Decision for the Idaho High-Level Waste and Facilities Disposition Environmental Impact Statement (HLW & FD EIS). ^d
Complete calcination of liquid sodium-bearing waste by December 31, 2012.	<i>Settlement Agreement</i>	The <i>Settlement Agreement</i> allows for negotiation of a modification if necessary. ^e The final schedule for sodium-bearing and calcined waste treatment will be determined in the record of decision for the HLW & FD EIS. ^d
Cease use of Tanks WM-180, WM-181, WM-187, WM-188, WM-189, and WM-190 (in monolithic vaults) by December 31, 2012.	<i>Second Modification to Consent Order to the Notice of Noncompliance</i>	The final schedule for sodium-bearing and calcined waste treatment will be determined in the record of decision for the HLW & FD EIS. ^d
Ship all transuranic waste at the INEEL to the Waste Isolation Pilot Plant (or another DOE-designated facility) by a target date of December 31, 2015, and no later than December 31, 2018.	<i>Settlement Agreement</i>	
Complete treatment of all calcined waste at the INEEL by a target date of 2035.	<i>Settlement Agreement</i>	The final schedule for calcined waste treatment will be determined in the record of decision for the HLW & FD EIS. ^d

a. DOE 1995

b. Hovinga 1998.

c. DOE-ID 1998.

d. The draft HLW & FD EIS was released for public comment in December 1999 (DOE 1999).

e. DOE 1995, Part J, Subpart 4, p. 11.

- Minimize infiltration and subsequent contaminant leaching caused by external building drainage and run-on.

The interim action specified for Tank Farm soil consists of institutional controls with surface water control to reduce surface water infiltration into Tank Farm soil. This reduction should limit leaching and transport of soil contaminants to the aquifer. Institutional controls include warning signs, administrative controls to restrict access, and inspection and maintenance for the duration of the interim action from 2000 to 2008 or until OU 3-14 remedial action begins. Surface water control measures include surface water run-on diversion channels; grading and surface sealing the Tank Farm soil or covering the Tank Farm sufficient to divert 80% of the precipitation falling atop the Tank Farm soil area to direct water away from the contaminated areas so that moisture infiltration is minimized and contaminants are not mobilized. Run-on water will be managed as part of the existing surface water drainage system and runoff water will be collected and managed in a lined evaporation pond to be constructed as part of the interim action. The evaporation pond will be constructed and used as a best management practice to reduce infiltration into the INTEC area. The pond will also contain the Tank Farm runoff in the case of an unplanned spill or release. During the interim action period, INTEC-wide monitoring will be performed to evaluate potential changes in water content and quality in SRPA.

Based on preliminary information, the following strategies may be used to implement this interim action:

- Grading and lining with concrete all existing stormwater collection ditches around the Tank Farm and out to the discharge point.
- Replacing existing culverts around the Tank Farm and out to the discharge point with larger culverts to accommodate the expected increase in stormwater flow.
- Constructing a lift station at the intersection of Beech and Olive avenues to pump stormwater to a location where the water will drain freely to the discharge point.
- Constructing concrete headwalls and end walls as necessary throughout the lined drainage system.
- Constructing a lined evaporation pond to collect stormwater runoff from the Tank Farm and other INTEC areas that currently drain into the CERCLA environmentally controlled area (ECA) 37A. All drainage ditches within the scope of this project would be routed to this basin.
- Constructing two concrete-lined ditches within the Tank Farm to collect and direct precipitation runoff to the surrounding stormwater collection system.
- Constructing a new fence around the evaporation pond.
- Applying a covering over the ground at the Tank Farm to minimize stormwater infiltration into the underlying soil. A geotextile material would be placed on the ground, and a polyurea spray-on liner would be applied over the geotextile material. Before this application, the ground surface would be graded to create a positive drainage (away from the Tank Farm). No excess soil is expected; rather, clean soil may be brought in to create the necessary drainage. The existing 1977 Dupont Polyolefin 3110 membrane will be left in place.

- It is anticipated that OU 3-14 Phase I characterization activities at the Tank Farm will be conducted after the OU 3-13 Group 1 interim action surface coating is in place. Coordination will occur between the OU 3-13 Group 1 interim action, construction schedule and the schedule for the OU 3-14 Phase I characterization activities at the Tank Farm. The OU 3-13 Tank Farm Interim action plan specifies that the surface coating will be easily repairable when breached for any reason. It will be the responsibility of OU 3-14 to repair or restore the integrity of the surface coating and sealant on the Tank Farm surface after OU 3-14 RI/FS Tank Farm activities.

The OU 3-13 ROD stated that interim action activities will occur concurrently with OU 3-14 RI/FS activities (DOE-ID 1999b). It is anticipated that OU 3-14 Phase I characterization activities at the Tank Farm will be performed after the OU 3-13 Interim Action of placing a cover and surface seal over the Tank Farm soil. OU 3-13 Group 1 and OU 3-14 will work together to coordinate their schedules, avoiding unnecessary interference with each other's work activities. Restoration of the cover and surface seal will be the responsibility of the OU 3-14 RI/FS, to ensure that the integrity of the surface seal is not jeopardized.